

Amendments to the Drawings:

The attached replacement sheet 3 of drawings includes changes to Figs. 3, 6A, and 6B and replaces the original sheet including Figs. 3, 6A, and 6B.

In Figure 3, 6A, and 6B, the label "Prior Art" has been added.

Attachments following last page of this Amendment:

Replacement Sheet (3 pages)

REMARKS

In response to the Office Action dated April 11, 2007, applicants have amended claim 44. Claims 1-53, 55, 56, 58, and 62-64 are presented.

Applicants thank the Examiner for his indication that claims 30-43 would be allowable if rewritten or amended to overcome the rejections under 35 USC § 101 and double patenting.

Drawings

The Examiner objected to the corrected drawings submitted on April 20, 2007. Applicants enclose corrected drawings for Figures 3, 6A, and 6B and ask, in view of the corrections, that the objection to these drawings be withdrawn.

Claim Rejections – 35 USC § 101

Claims 1-43, 53, 55, and 62-64 stand rejected as directed to non-statutory subject matter under 35 U.S.C. § 101. Applicants traverse for the following reasons.

Independent Claim 1, for example, is directed to a method for determining the location of an alignment mark on a stage that requires:

- measuring a location, x_1 , of a stage along a first measurement axis using an interferometer;
- measuring a location, x_2 , of the stage along a second measurement axis substantially parallel to the first measurement axis; and
- determining a location of the alignment mark along a third axis substantially parallel to the first measurement axis based on x_1 , x_2 , and a correction term, ψ_3 , wherein the interferometer comprises interferometer optics configured to direct a measurement beam to reflect from a mirror where the interferometer optics or the mirror are attached to the stage, and ψ_3 is calculated from predetermined information comprising information characterizing imperfections in the interferometer optics.

The Examiner states that "[c]laim 1 fails to meet the criteria for a “physical transformation” ... [or] a “tangible result”” (Office Action, page 4). We respectfully disagree.

We reiterate that the Examiner's position with respect to claim 1 is in direct conflict with Federal Circuit precedent. In Arrhythmia Research Technology Inc. v. Corazonix Corp., 958

F.2d 1053, 22 USPQ2d 1033 (Fed. Cir.1992), the Federal Circuit held that a method claim that directed to “determining” information satisfied the requirements of § 101. The claim at issue in *Arrhythmia* recited:

[a] method for analyzing electrocardiograph signals to determine the presence or absence of a predetermined level of high frequency energy in the late...signal, comprising the steps of: converting a series of...signals to time segments, each segment having a digital value equivalent to the analog value of said signals at said time; applying a portion of said time segments in reverse time order to high pass filter means; determining an arithmetic value of the amplitude of the output of said filter; and comparing said value with said predetermined level.

Id. at 1055 (emphasis added). The *Arrhythmia* court held that this claim meets the requirements of § 101 because:

[w]hile many steps in the... process involve the mathematical manipulation of data...the claims do not disclose mere abstract ideas, but a practical ... process.

Id. at 1065-66 (emphasis added). This reasoning has been reaffirmed more recently by the Federal Circuit:

[In *Arrhythmia*]...the transformation of electrocardiograph signals from a patient's heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete or tangible thing--the condition of a patient's heart.

State Street Bank & Trust Co. v. Signature Financial Group, 149 F.3d 1368, 38 USPQ2d 1530 (Fed. Cir. 1998).

Applicants' claim 1 is directly analogous to the *Arrhythmia* claim. Both claims recite acquiring a information related to a physical system. Compare, for example, the measured locations of applicants' claim with the electrocardiograph signals in the *Arrhythmia* claim. Both represent a quantity of practical interest corresponding to useful, concrete and tangible thing. Moreover, both claims include steps that involve manipulation of data representing a quantity of practical interest corresponding to useful, concrete and tangible thing. Compare “determining a location of the alignment mark” in applicant's claim with “determining an arithmetic value of the amplitude of the output of said filter; and comparing said value with said predetermined level.”

Thus applicant's claim, like the Arrhythmia claim, discloses not merely an abstract idea, but a patentable, practical process.

The Examiner also suggests that, without more, applicants' claimed process does not produce a sufficiently tangible result to satisfy the requirements of § 101. Again, this suggestion is in direct conflict with Federal Circuit precedent. In State Street Bank & Trust Co. v. Signature Financial Group, the Federal Circuit concluded that

...the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result"--a final share price *momentarily fixed for recording and reporting purposes*. 149 F.3d at 1373 (emphasis added).

Thus, a method which results solely in a mathematically determining a quantity can in fact satisfy § 101 if the result is sufficiently "a useful, concrete and tangible." Applicants submit that the "location of the alignment mark" derived by their method is certainly no less useful, concrete, and tangible than the final share price determined by the State Street invention. The derived information is a quantity which corresponds to concrete properties of a physical system. This quantity provides useful information about, for example, the stage. Once derived, the information is, like the final share price of State Street at least momentarily fixed for recording, reporting, or other purposes. Therefore, the claimed method produces a useful, concrete, and tangible result.

In light of the Federal Circuit precedent described above, applicants respectfully submit that their method in claim 1 satisfies the requirements of § 101 because, taken as a whole, the method constitutes a practical application. This conclusion is in accord with Supreme Court precedent which holds that:

...when a claim containing [an abstract idea] implements or applies that [idea] in a ...process which, when considered as a whole, is performing a function which the patent laws were designed to protect...the claim satisfies the requirements of Sec. 101.

Diamond vs. Diehr, 450 U.S. 175, 192 (1981). Moreover, this conclusion is in accord with the Patent Office's Interim Guidelines cited by the Examiner, which state that:

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a Sec. 101 judicial exception, in that the process claim must set forth a practical application of that Sec. 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a . . . process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract."
OG Notices: 22 November 2005 "Interim Guidelines for Examination of Patent

Applications for Patent Subject Matter Eligibility" § IV (C) (2) (b) (2) (emphasis added).

Applicants therefore ask the Examiner to withdraw the rejection of claim 1 under 35 U.S.C. § 101.

Claims 2-16, 53, and 55 depend, either directly or indirectly, from claim 1. Applicants submit therefore that these claims cover patentable subject matter under § 101 for at least the same reasons as claim 1. Applicants respectfully ask the Examiner to also withdraw his rejection of these claims.

Applicants further submit, for similar reasons to those set forth above with respect to the claim 1, the methods of independent claims 17, 30 and 40 are also directed to statutory subject matter under 35 U.S.C. § 101. Applicants there ask the Examiner to withdraw the rejection of these claims under 35 U.S.C. § 101.

Claims 18-29, 31-39, 41-43, and 62-64 depend, either directly or indirectly, from claims 17, 30, or 40. Applicants submit therefore that these claims cover patentable subject matter under § 101 for at least the same reasons as claims 17, 30 or 40. Applicants respectfully ask the Examiner to also withdraw his rejection of these claims.

Claim Rejections – 35 USC § 102

Claims 1-16, 53, 55, 56, and 58 stand rejected as being anticipated by Kamiya. Among other limitations, claims 1-16, 53, 55, 56, and 58 require "determining a location of [an]

alignment mark ... based on ... a correction term, ψ_3 , [which] is calculated from predetermined information comprising information characterizing imperfections in the interferometer.”

According to the Examiner, the claim language “suggests the step of calculating ψ_3 but does not require steps to be performed and therefore does not limit the scope of the method claimed” (Office Action, page 9). Regardless of whether or not the claim requires the step of calculating ψ_3 to be performed, the claim unequivocally does require determining an alignment mark location based on ψ_3 which “is calculated from predetermined information comprising information characterizing imperfections in the interferometer.” Kamiya does not disclose or suggest methods that include determining a location of an alignment mark based on such a correction term. Accordingly, Kamiya does not anticipate claims 1-16, 53, 55, 56, and 58 and applicants ask that the prior art rejection of these claims under 35 USC § 102 be withdrawn.

Claims 17-29 and 62-64 were also rejected as being anticipated by Kamiya. However, Kamiya does not disclose or suggest methods that include “determining a correction term related to imperfections in interferometer optics ..., where the interferometer optics are configured to direct a beam to reflect from [a] measurement object,” as required by these claims. Rather, Kamiya discloses using an interferometry system to characterize imperfections in a plane mirror measurement object (Kamiya, col. 3, lines 33 – 43). According to the Examiner, “the imperfections in the interferometer optics are the measurement mirror curving error and claim 17 does not differentiate between the optics and the mirror” (Office Action, page 12). However, this seemingly ignores the requirement in the claims that “the interferometer optics are configured to direct a beam to reflect from the measurement object,” which clearly differentiates the “interferometer optics” and the “measurement object.” Accordingly, applicants submit that Kamiya does not anticipate claims 17-29 and 62-64 and ask the Examiner to reconsider the rejection of these claims under 35 USC § 102.

Claims 44-52 were also rejected as being anticipated by Kamiya. These claims are directed to an apparatus and require “an electronic controller coupled to [an] interferometer and configured so that during operation the electronic controller determines a location of the mirror surface along a third axis based on ... a correction term, ψ_3 , calculated from predetermined

information comprising information characterizing imperfections in the interferometer optics.” Kamiya does not disclose or suggest an apparatus that includes electronic controller configured to determines “a location of [a] mirror surface .. based on ... a correction term, ψ_3 , calculated from predetermined information comprising information characterizing imperfections in the interferometer optics.” In his rejection, the Examiner appears to have simply ignored this limitation as being a functional limitation. According to the Examiner, “a functional limitation and [sic] can be met by the prior art if the structure of the prior art is capable of performing the claimed functions” (Office Action, page 15). The Examiner also states that “[f]or functional language to limit an apparatus claim the limitation must be claimed using a “means-plus-function” format of 35 U.S.C. § 112, sixth paragraph” (Office Action, page 15). However, the Examiner does not indicate the legal basis for this requirement, nor are applicants aware of any such requirement for claiming apparatus functionally. To the contrary, according to the courts an “[a]pplicant is given, by statute, right to claim invention with limitations he regards as necessary to circumscribe that invention with proviso that application comply with requirements of statute governing specification” In re Weber, 580 F.2d 455, 198 U.S.P.Q. 328 (CCPA 1978). Moreover, “[t]here is nothing inherently wrong with defining some part of an invention in functional terms.” In re Swinehart, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

Furthermore, the Examiner is reminded that

“[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). [See MPEP 2131]

Further,

[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of

circumstances is not sufficient.' " In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) [See MPEP 2112, emphasis added]

Applicants could find no express or inherent disclosure in Kamiya that his apparatus include "an electronic controller coupled to [an] interferometer and configured so that during operation the electronic controller determines a location of the mirror surface along a third axis based ... a correction term, ψ_3 , calculated from predetermined information comprising information characterizing imperfections in the interferometer optics," nor has the Examiner indicated where such disclosure can be found. Accordingly, applicants submit that claims 44-52 are not anticipated by Kamiya and ask that the rejection of these claims under 35 USC § 102 be withdrawn.

Double Patenting

The action also rejected claims 1-53, 55, 56, 58, 59, and 62-64 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of copending Application No. 10/630,361. Application No. 10/630,361 has been abandoned. Applicants therefore ask the Examiner to withdraw this rejection.

Applicants submit that all claims are in condition for allowance, which action is requested. Please apply \$120 for the Petition for Extension of Time fee and any other charges or credits to deposit account 06-1050.

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Page : 22 of 22

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Respectfully submitted,

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